

WHAT IS CLAIMED IS:

1. A data storage medium, comprising:

a recording layer containing molecules having a charge transport characteristics, molecules having a nonlinear optical characteristics, and optical functional molecules whose stereostructure is changed depending on a light irradiation; and

a pair of transparent ohmic electrodes sandwiching the recording layer, the conductivity of the data storage medium being lowered by the light irradiation.

2. The data storage medium according to claim 1, wherein an ionization potential, a permanent dipole moment or a mobility is changed by the change in the stereostructure of the optical functional molecule.

3. The data storage medium according to claim 2, wherein the permanent dipole moment is increased by at least 0.7 debye by the change in the stereostructure of the optical functional molecule.

4. The data storage medium according to claim 2, wherein the ionization potential is changed by at least 0.01 eV by the change in the stereostructure of the optical functional molecule.

5. The data storage medium according to claim 2, wherein the mobility is lowered by the change in the stereostructure of the optical functional molecule to 0.5 or less times as much as the value of mobility before the change in the stereostructure of the optical

functional molecule.

6. The data storage medium according to claim 1,
wherein the optical functional molecule is at least one
compound selected from the group consisting of spiro
5 pyrans, spiro oxazines, fulgides, cyclophenes, diaryl
ethene series compounds, chalcon derivatives, azo
benzene series compounds, polyacrylate or polysiloxane
having a cyano biphenyl group, which is prepared by
allowing a high molecular weight liquid crystal
10 material to contain a photochromic molecule, and
polysiloxane having a spiro benzofuran group.

7. The data storage medium according to claim 1,
wherein the recording layer further contains a trapping
material.

15 8. The data storage medium according to claim 1,
wherein the ohmic electrode is formed of ITO, Au, Al or
Mg.

9. The data storage medium according to claim 1,
further comprising a transparent substrate formed on
20 one of the ohmic electrodes.

10. The data storage medium according to claim 1,
wherein a poling treatment is applied in the recording
layer of the data storage medium.

11. A data storage apparatus, comprising:
25 a data storage medium including a recording layer
containing molecules having a charge transport
characteristics, molecules having a nonlinear optical

characteristics, and optical functional molecules whose stereostructure is changed according to light beam irradiation, and a pair of transparent ohmic electrodes sandwiching the recording layer, the conductivity of the data storage medium being lowered by the light beam irradiation;

a power source applying an electric field between the pair of transparent ohmic electrodes of the data storage medium;

a light source irradiating the data storage medium with the light beam;

a beam splitter dividing the light beam into two sections;

a spatial light modulator adding a data to be recorded to one of the divided light sections; and

an optical architecture allowing the divided two light sections to cross each other within the data storage medium forming an interference fringe in the recording layer of the data storage medium so as to write data.

12. The data storage apparatus according to claim 11, wherein an ionization potential, a permanent dipole moment or a mobility is changed by the change in the stereostructure of the optical functional molecule.

13. The data storage apparatus according to claim 12, wherein the permanent dipole moment is increased by at least 0.7 debye by the change in the

stereostructure of the optical functional molecule.

14. The data storage apparatus according to claim 12, wherein the ionization potential is changed by at least 0.01 eV by the change in the stereostructure of the optical functional molecule.

15. The data storage medium according to claim 12, wherein the mobility is lowered by the change in the stereostructure of the optical functional molecule to 0.5 or less times as much as the value of mobility before the change in the stereostructure of the optical functional molecule.

16. The data storage medium according to claim 11, wherein the optical functional molecule is at least one compound selected from the group consisting of spiro pyrans, spiro oxazines, fulgides, cyclophenes, diaryl ethene series compounds, chalcon derivatives, azo benzene series compounds, polyacrylate or polysiloxane having a cyano biphenyl group, which is prepared by allowing a high molecular weight liquid crystal material to contain a photochromic molecule, and polysiloxane having a spiro benzofuran group.

17. The data storage medium according to claim 11, wherein the recording layer further contains a trapping material.

18. The data storage medium according to claim 11, wherein the ohmic electrode is formed of ITO, Au, Al or Mg.

19. The data storage medium according to claim 11,
further comprising a transparent substrate formed on
one of the ohmic electrodes.

20. The data storage medium according to claim 11,
5 wherein a poling treatment is applied in the recording
layer of the data storage medium.